भारतीय मानक

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Indian Standard

प्रक्रमित लौह क्षेप्य (स्क्रैप) का वर्गीकरण — रीति संहिता

(दूसरा पुनरीक्षण)

Processed Ferrous Scrap — Code for Classification

(Second Revision)

ICS 77.080.10, 77.080.20, 77.140

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

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Wrought Steel Products Sectional Committee, MTD 04

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by Wrought Steel Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in l963 and subsequently revised in l994. While reviewing the standard, in the light of experience gained during these years, the committee decided to revise it to bring it in line with the Institute of Steel Recycling Industries (ISRI) classification.

In this revision, the following significant changes have been made:

a) Scope of the standard has been expanded to include all types of ferrous scrap. The entire ferrous scraps are divided into three segments “Home Scrap”, “Prompt Scrap” and “Obsolete Scrap”. All forms of “Prompt Scrap” and “Obsolete Scrap” are included.
b) “Home Scrap” which can be directly sold to market is also included. However, “Home Scrap” which is consumed internally by steel manufacturing units are excluded and kept beyond the scope of present standard.
c) Discusses cleanliness, contamination, non-conformity and safety in detail.
d) Classification based on forms, sizes and shapes enables to separate re-melting scrap from re-rolling and re-manufacturing types of scrap. Post initial sorting, the segregated re-melting scrap may be further reduced in shredders, slitters or cutters to reduce sizes for increasing the bulk density of the finished batches. The final prepared re-melting scraps are either supplied in loose form (including sheared and shredded), bundled form or baled.
e) Provision for supplying the coated samples are also adequately covered in the existing revision.
f) The existing standard introduces new type of scrap category like light melting scrap (LMS), terne plate bundle, incinerator bundle, steel can bundle, expanding variety of turnings and borings, foundry scraps, automotive scraps (end of vehicle life), rail road scraps and tyre bead wires. In addition, various dimensions in the existing standard is being kept in line with ISRI standard to create harmony between domestic and exported ferrous scraps.
g) Introduces a new section on remanufacturing scraps. All home, prompt and obsolete scraps that can directly translate into finished components without the need of re-manufacturing or re-rolling are also included.

This standard has been prepared to assist the industry in maximizing utilization of ferrous scraps. The domestic consumption of iron and steel scrap is bound to increase, and the standard is expected to remove ambiguity and confusion that might arise from individual interpretation of different grades of scrap and terminology used in ferrous scrap industry.

With increasing steel production and India becoming second largest steel producer in the world, the stress will be on raw material to fulfill domestic demand. In such a scenario, scrap utilization to the maximum possible extent will reduce the burden not only on raw material mining but also on carbon emission and energy consumption. In order to adopt the philosophy of maximizing scrap-based steelmaking it was envisaged to build a robust and detailed scrap standard which will be on par with all international standards. The second revision aims towards rationalizing the earlier version and make it more friendly and broader covering almost every possible variety of ferrous scrap.

(*Continued on third cover*)

Indian Standard

PROCESSED FERROUS SCRAP — CODE FOR CLASSIFICATION

(Second Revision)

1 SCOPE

1.1 This standard classifies:

a) Ferrous scrap generated at steel processing and product manufacturing sites (termed as Prompt Scrap);
b) Ferrous scrap generated post end of useful life (Obsolete Scrap); and
c) Ferrous scrap generated at steel manufacturing units (Home Scrap) which can be sold to market rather recycling internally.

1.2 The scope is valid for all types of Ferrous scraps including cast iron, tool steel, alloy steel and stainless steel.

1.3 Other internal wastes like flue dust, BF BOF/EAF/IF slags, spent pickle liquor, mill scale, BOF filter cake etc. are beyond the scope of this standard generally termed as “By-products”.

1.4 Home Scrap which are consumed internally by steel manufacturing units are excluded and kept beyond the scope of this standard.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS No.	*Title*
IS 1387 : 1993	General requirement for the supply of metallurgical materials
IS 1956	Glossary of terms relating to iron and steel:
(Part 3) : 2019	Long products (including bars, rods, sections and wires) (*second revision*)
(Part 4) : 2013	Flat products (*second revision*)
IS 7598 : 1990	Classification of steels

3 GENERAL CONDITIONS

General requirements relating to the supply of material shall conform to IS 1387.

4 TERMINOLOGY

4.1 Baling — Hydraulically compaction process for aggregating loose scraps having high surface area and low density.

4.2 Briquetting — Compaction process of small scraps assisted by heating depending on the type of materials.

4.3 Shearing — Slicing heavy pieces of ferrous scrap including I-beams, ship plates, pipes and railroad car sides.

4.4 Shredding — Reduction of big size ferrous scrap into small pieces using hammer mills. Mostly automotive hulk and white goods are reduced in shredder.

4.5 Incineration — Ferrous scraps subjected to combustion for removal of organic/inorganic materials from surface.

4.6 Coating/Plating — Thin metallic, nonmetallic and organic layer adhering to substrate, giving resistance to wear/corrosion. This include zinc, zinc-aluminum, silicon, zinc-iron, tin, enamel, chrome/nickel/cadmium etc.

5 CLEANLINESS

5.1 All grades of ferrous scrap shall be free of dirt, nonferrous metal or foreign materials of any kind, any excessive rust, corrosion, byproduct contamination like slag, mill scale, baghouse dust, grinder dust, sludge etc. However, the term free of dirt, nonferrous materials or foreign material of any kind are not intended to preclude the accidental inclusion as far as possible.

5.2 All grades of ferrous scrap shall be free of amounts of combustible nonmetallic materials, including, but not limited to rubber, plastic, fabric, wood, oil, lubricants and other chemical or organic substances as far as possible.

6 RESIDUALS

6.1 Copper

All grades of ferrous scrap shall be free of visible metallic copper, which means free of copper-wound electric motors, rotors, braking system, sheets and copper coated materials, bearing shells, wires and cables, electromagnet, copper fittings and radiator cores.

6.2 Tin

All grades of ferrous scrap shall be free of tin in any form such as tin cans, tin coated materials etc. as well as bronze elements such as solders, collapsible tubes, tin plate foils, rings, bearing shells unless specified etc. All tin coated materials to be treated separately under tinned or coated scraps.

6.3 Lead

All grades of ferrous scrap shall be free of lead in any forms such as batteries, solder, wheel weights, cable sheath, bearings, bearing shells, lead acid batteries including automotive batteries etc. Terne plate scrap is classified separately and shall not be mixed with any other form of scrap.

6.4 Chromium, Nickel and Molybdenum

Use of chromium, nickel and molybdenum containing mechanical parts such as motors, drive gears, axles, gear boxes, gear wheels, tools and dies shall be restricted in all grades of ferrous scrap.

6.5 Mercury

All grades of ferrous scrap shall be free of mercury and mercury containing materials. Mercury containing materials include but are not limited to: mercury wetted or containing relays, switch gear, dry cell batteries, rectifiers, gauges, thermometers, manometers, barometers, fluorescent lighting fixtures, advertising signs, high intensity and mercury vapor lights.

6.6 Cadmium

All grades of ferrous scrap shall be free from cadmium containing materials. Cadmium containing materials include but are not limited to: Ni-Cd batteries used in applications like locomotive starting, emergency braking, coach lightening, air conditioning, military communication, solar energy storage, operation theater, plating, plastics, pigments etc. However, copper, chromium, nickel and molybdenum in the steel substrate is acceptable under the limitation prescribed by IS 7598.

6.7 MIXTURE OF GRADES

No delivery shall contain a mixture of grades, unless mutually agreed between the supplier and the purchaser.

6.8 NON-METALLIC RESIDUALS

6.8.1 In any grades of ferrous scrap following are not permissible, but not limited to, which includes;

a) Refrigerants (including CFCs and HCFCs), heat pumps and air conditioners. Persistent organic pollutants (POPs) found in various sources;

b) Clinical and medical wastes like syringes, medicines, vaccines, containers, glass wares, gloves, bandages, swabs, tissues, test tubes, veterinary wastes etc;

c) Asbestos or asbestos containing materials, such as pipe insulation, fire retardants, acid resistant and surfacing material;

d) Arsenics or arsenic containing material used in electrical circuits, wood preservatives etc;

e) Oils, gasoline, petroleum products and antifreeze. This includes hydraulic fluids, gear oils, coolants and grease. Hydraulic equipment must have hydraulic hoses removed, cylinders cut open and drained;

f) Items that contain or have contained poly-chrominated biphenyls, including small capacitors, printed circuit boards, X-ray screens, CT scanners, monitors, paints, sealants, fluorescent light ballasts and electrical transformers or transformer components;

g) Automobile airbags, which contain sodium azide. Paint cans or other paint containers. Cyanides used in insecticides and pesticides;

h) Acetylene, freon, propane and other organic compounds containing bottles and other sealed containers. Sealed containers are described as air or watertight containers without visible openings. Any material containing hazardous or toxic substances;

j) Military scrap of any kind, unless mutually agreed between supplier and the purchaser in advance. Explosives, fracturing guns, unbroken shells and tubes, transformers or any explosive residues;

k) Tyres, wood, dirt, yard debris, concrete, asphalt, glass, excessive fluff, rubber, other non-metallic materials; and

m) Isotopes of chromium (hexavalent chromium etc), poly-brominated biphenyl, poly-brominated diphenyl ethers, deca-brominated diphenyl ethers, hexa-bromo cyclo-dodecane, perfluoro octane sulfonates etc are restricted.

6.8.2 All deliveries of ferrous scrap shall comply with the statutory requirements for preservation of health and safety

7 SAFETY AND RADIOACTIVITY

7.1 All grades of ferrous scrap shall exclude pressurized, fuel, closed or insufficiently open containers of all origins, which could cause explosions and hazards.

7.2 All grades of ferrous scrap shall exclude dangerous material, inflammable or explosive, fire-arms (whole or in part), ammunitions, dirt or pollutants which may contain or emit substances dangerous to human health or to the environment or to the steel production process.

7.3 All grades of ferrous scrap shall be checked, within the limitations of accessibility and in strict compliance with appropriate detection equipment for radioactivity, to identify material presenting radioactivity in excess of the ambient level of radioactivity.

7.4 All grades of ferrous scrap shall be checked, for any radioactive material in sealed containers even if no significant exterior radioactivity is detectable due to shielding or position of the sealed source in the scrap delivery.

7.5 Any ferrous scrap potentially resalable be sheared or cut prior to delivery. All deliveries shall comply with the statutory requirements for preservation of health and safety.

8 CLASSIFICATION OF SCRAP BASED ON SOURCE OF GENERATION

All ferrous scraps shall broadly be classified in three different types based on the source of generation.

8.1 Home Scrap

All grades of ferrous scrap in clean form generated in steel manufacturing unit which is used for internal consumption by charging back to melting furnace, cupola or foundries. However, home scrap covered in this specification is designated for sale for external consumption.

8.2 Prompt Scrap

All grades of ferrous scrap in clean form generated in steel product consuming and processing units while re-processing.

8.3 Obsolete Scrap

All grades of ferrous scrap generated post completion of useful service life. The end of life cycle is post completion of its service period fixed by regulatory or statutory bodies or being discarding by the user/owner for scrappage.

9 CLASSIFICATION OF SCRAP BASED ON USE

9.1 Steel Scrap for Re-melting

Any ferrous scraps suitable for the process of re-melting through BOF/EAF/IF route is classified under this category. The collected scraps can be used directly or reduced to smaller sizes for charging in the furnace. Compaction shall be carried for low density scraps.

9.2 Steel Scrap for Re-rolling

Any ferrous scrap either home, prompt or obsolete fit for re-rolling application without need of re-melting. The scrap should be internally sound and its chemical composition shall conform the final specification. The scrap shall be of appropriate dimension fit for rolling and translating it into the finished product conforming to the requirements of the final product standard.

9.3 Steel Scrap for Re-manufacturing

Any scrap either home, prompt or obsolete without the need of re-melting or re-rolling can be translated into end components meeting final product standard only by means of mechanical operations.

10 REMELTING SCRAP

The various classification of re-melting scraps based on shapes and sizes are:

10.1 Heavy Melting Scrap (HMS)

Major source of HMS is generally obsolete scraps; however, it can also have scrap coming from home scrap as well prompt scraps. This scrap is mostly generated while dismantling of buildings, bridges, ships, automotive, plant & machinery etc.

10.1.1 *No. 1 Heavy Melting Scrap (HMS-1)*

It shall consist of reasonably clean ferrous uncoated scraps of thickness not less than 6 mm and in sizes not exceeding 1 500 mm x 600 mm. Individual pieces shall be free from attachment and shall be so cut as to lie flat in the charging box in loose form and meant only for re-melting.

The standard sizes usually include:

a) 900 mm x 600 mm;
b) 600 mm x 600 mm;
c) 450 mm x 450 mm; and
d) 300 mm x 300 mm.

However, sizes other than the above can also be supplied as agreed between the buyer and the supplier.

10.1.2 *No. 2 Heavy Melting Scrap (HMS-2)*

It shall consist of reasonably clean ferrous coated and uncoated scraps of thickness not less than 3 mm in sizes and not exceeding 1 500 mm x 600 mm. Individual pieces shall be free from attachment and shall be so cut as to lie flat in the charging box in loose form and meant only for re-melting.

The standard sizes usually include:

a) 900 mm x 600 mm;
b) 600 mm x 600 mm;
c) 450 mm x 450 mm; and
d) 300 mm x 300 mm.

However, sizes other than the above can also be supplied as agreed between the buyer and the supplier.

10.2 Light Melting Scrap (LMS)

Light melting scrap are thin gauge ferrous scraps generated either as home, obsolete or prompt scraps. The biggest source could be obsolete scrap like galvanized or non-galvanized automotive bodies, roofing, panels, ducts, boxes, cabins etc.

10.2.1 *No. 1 Light Melting Scrap (LMS-1)*

It shall consist of reasonably clean ferrous uncoated scrap less than 3 mm thickness and in sizes not exceeding 1 500 mm x 600 mm. Individual pieces shall be free from attachment and shall be so cut as to lie flat in the charging box in loose form and meant only for re-melting.

The standard sizes usually include:

a) 900 mm x 600 mm;
b) 600 mm x 600 mm;
c) 450 mm x 450 mm; and
d) 300 mm x 300 mm.

However, sizes other than the above can also be supplied as agreed between the buyer and the supplier.

10.2.2 *No. 2 Light Melting Scrap (LMS-2)*

It shall consist of reasonably clean ferrous coated scrap (*see* **4.6**) less than 3 mm thickness and in sizes not exceeding 1 500 mm x 600 mm. Individual pieces shall be free from attachment and shall be so cut as to lie flat in the charging box in loose form and meant only for re-melting.

Other standard sizes shall be 900 mm x 600 mm, 600 mm x 600 mm, 450 mm x 450 mm and 300 mm x 300 mm.

10.3 The contracting parties may mutually agree for sizes other than those indicated standard sizes in both No.1 and No.2 HMS and LMS, but sizes shall not exceed 1 500 mm x 600 mm.

10.4 The HMS and LMS can also be supplied in compressed form in a charging box. Sizes shall not exceed 1 500 mm X 600 mm and weighing not less than 1 200 kg/cubic meter. However, the coated and the uncoated scrap shall not be mixed and to be supplied separately in charging boxes. Mixing is allowed based on mutual agreement between the purchaser and the supplier.

10.3 End-Cuts/Crops/Shears

This ferrous scrap is generally home scrap generated mostly at steel manufacturing units. It shall consist of reasonably clean ferrous scrap in finished and semi-finished forms.

10.3.1 *End Cuts of Semi-Finished*

It shall consist of crop-ends, cuttings, shearing, of slabs, bars, blooms, billets, ingots, forging scraps, of not less than 25 mm thick, and in sizes not exceeding 1 500 mm x 600 mm.

The standard sizes usually include:

a) 900 mm x 600 mm;
b) 600 mm x 600 mm;
c) 450 mm x 450 mm; and
d) 300 mm x 300 mm.

However, sizes other than the above can also be supplied as agreed between the buyer and the supplier.

10.3.2 *Heavy End Cuts*

It shall consist of crop-ends, cuttings, shearing, trims, off cuts, side cuts, of forgings, plates, bar, rods, structural shapes, tubes, wires, angles, channels, axles, wheels, rails etc. of not less than 6 mm thick, and in sizes not exceeding 1 500 mm x 600 mm.

The standard sizes usually include:

a) 900 mm x 600 mm;
b) 600 mm x 600 mm;
c) 450 mm x 450 mm; and
d) 300 mm x 300 mm.

However, sizes other than the above can also be supplied as agreed between the buyer and the supplier.

10.3.3 *Light End Cuts*

It shall consist of crop ends, cuttings, shearing, side cuts, trims, offcuts of tubes, wires, angles, channels, plates, strips etc. of not more than 6 mm thick, and in sizes not exceeding 1 500 mm x 600 mm.

The standard sizes usually include:

a) 900 mm x 600 mm;
b) 600 mm x 600 mm;
c) 450 mm x 450 mm; and
d) 300 mm x 300 mm.

However, sizes other than the above can also be supplied as agreed between the buyer and the supplier.

NOTE — The contracting parties may mutually agree for sizes other the indicated standard sizes in end cuts (semi-finished or finished under heavy and light section), but sizes shall not exceed 1 500 mm x 600 mm.

10.4 Bushellings and Shovelings

These are the residues of manufacturing units in the form of small ferrous scrap pieces generated after manufacturing of the final components.

10.4.1 *No. 1 Bushellings*

It shall consist of clean ferrous scrap not exceeding 1 500 mm x 600 mm in any dimension including new factory bushelling such as sheet clippings, stampings, punching etc. of any gauge. It shall be free from coating (*see* **4.6**), such as lime coating, vitreous enameling zinc coating, tinned etc. It shall also be free from electrical sheets over 0.5 percent silicon, old automobile bodies and fender stock and tinned products. It shall not include material obsolete scrap sources.

10.4.2 *No. 2 Bushellings*

It shall consist of clean ferrous scrap not exceeding 1 500 mm x 600 mm in any dimension including new factory bushelling such as sheet clippings, stampings, etc containing coating (*see* **4.6**), such as, lime coating, vitreous enameling, zinc coating, tinned etc. of any gauge. It shall also contain material from obsolete scrap except electrical sheets over 0.5 percent silicon, old automobile bodies and fender stock and tinned products.

10.4.3 *Silicon Clippings*

It shall consist of clean silicon bearings and treated ferrous scrap including new factory bushellings and shoveling, for example clippings, stampings, punching. May not include old auto body and fender stock. Free of metal coated, limed, vitreous enameled and electrical sheet containing minimum 1 percent silicon of any gauge.

10.4.4 *Silicon Bushellings*

Clean silicon bearing ferrous scrap, not exceeding 300 mm in any dimension, including new factory busheling (for example, sheet clippings, stampings, etc), having a silicon content of 0.5 percent to 5.0 percent of any gauge.

10.4.5 *No. 1 Shovelings*

It shall consist of clean uncoated ferrous scrap not exceeding 150 mm in any dimension including new factory clippings, punching and stampings of any gauge.

10.4.6 *No. 2 Shovelings*

It shall consist of clean ferrous scrap with coating (*see* **4.6**) not exceeding 150 mm in any dimension including new factory clippings, punching and stampings of any gauge.

10.5 Shredded Scrap

This scrap shall be generated out of obsolete ferrous scrap or prompt ferrous scrap. These are the generated when big obsolete and prompt scrap are shredded into small pieces in a shredded machine.

10.5.1 *Shredded Scrap*

It shall consist of homogeneous ferrous scrap fragmented into pieces not exceeding 200 mm in any direction and magnetically separated. It shall be commercially free from dirt, non-ferrous metal and foreign materials and shall exclude grindings, scarf and turnings and borings. The classification is done based on minimum average density as indicated in Table 1.

Table 1 Shredded Scrap Classes
(*Clause* 10.5.1)

Sl No. (1)	**Class** (2)	**Minimum Average Density** (3)
i)	No. 1 Shredded Scrap	1100 kg/cubic meter
ii)	No. 2 Shredded Scrap	950 kg/cubic meter
iii)	No. 3 Shredded Scrap	800 kg/cubic meter
iv)	No. 4 Shredded Scrap	600 kg/cubic meter

NOTE — The contracting parties may mutually agree for densities other than those in the table above, but minimum average density shall be greater than 600 kg/ cubic meter.

10.6 Bundle Scrap

Tightly compacted bales of light and heavy gauges scrap produced in hydraulic balers. This may consist of prompt ferrous scrap and obsolete ferrous scrap in bundle form, generally in different bulk density.

10.6.1 *No. 1 Bundle (Hydraulic Baled)*

It shall consist of prompt ferrous scrap, cuttings or punching hydraulically compressed to a minimum bulk density of 1 200 kg/cubic meter. It shall be free from paint or coating (*see* **4.6**) of any kind. It may include chemically detinned material but shall not include any material containing more than 0.5 percent silicon. May include Stanley balls or mandrel wound bundles or skeleton reels, tightly secured.

10.6.2 *No. 2 Bundle (Hydraulic Baled)*

It shall consist of prompt/obsolete and galvanized ferrous scrap, auto body and fender stock hydraulically compressed to a minimum bulk density of 1 200 kg/cubic meter. It may include fence wire, sheets, rebars and light coil spring. It shall not include other metal coated ferrous scraps like tin and lead coated, vitreous enameled scraps etc.

10.6.3 *No. 3 Bundle (Hydraulic Baled)*

It shall consist of prompt and obsolete tinned, galvanized, enameled and other metal coated ferrous scrap hydraulically compressed to a minimum bulk density of 1 200 kg/cubic meter. It shall reasonably be free from dirt, non-ferrous material and non-metallics of any kind. It may include all coated ferrous scrap not suitable for inclusion in No. 2 bundle.

10.6.4 *Silicon Bundle (Hydraulic Baled)*

It shall consist of silicon sheet cuttings and punching containing over 0.5 percent silicon, hydraulically compressed to a minimum bulk density 1 200 kg/cubic meter.

10.6.5 *Terne Plate Bundles*

New terne plate ferrous scrap, lead bearing clippings or skeleton scrap, compressed or hand bundled, to charging box size, and hydraulically compressed to minimum bulk density of 1 200 kg/cubic meter (Hand bundles are tightly secured for handling with a magnet). May include Stanley balls or mandrel wound bundles or skeleton reels, tightly secured.

10.6.6 *Detinned Bundles*

It shall consist of chemically processed tin clippings, cuttings and punching. The tin content shall not exceed 0.1 percent. It shall be hydraulically compressed to minimum bulk density of 1 200 kg/cubic meter.

10.6.7 *Incinerator Bundle*

Tin can scrap, compress to the size of the charging box and shall be hydraulically compressed to minimum bulk density of 1 200 kg/cubic meter. Processed through a recognized garbage incinerator.

10.6.8 *Steel Can Bundles*

Steel can scrap compressed to charging box size and shall be hydraulically compressed to minimum bulk density of 1 200 kg/cubic meter. Cans may be baled without removal of paper labels, but free of other nonmetallic materials. May include tin coated containers. The percentage of tin in the bundle to be mutually agreed between the supplier and the customer.

NOTE — All bundles indicated in **10.6.1** to **10.6.8** can be bundled manually as per customer requirement provided the minimum bulk density of respective grades is being followed. bulk density other than those indicated shall be allowed on mutually agreed between the customer and the supplier.

10.7 Ferrous Turning and Boring Scrap

It shall consist of heavy and light ferrous turning and borings in both treated and untreated conditions from different foreign impurities of dirt, grease, oils etc. It also has the provision for mixed scrap where turnings and borings can be mixed. This is generally prompt scrap generated at the steel product manufacturer end. However, it may generate internally at plant level while scarfing or as an obsolete scrap.

10.7.1 *Heavy Steel Turnings*

It shall consist of clean steel heavy turnings, drilling or screw cuttings. It shall be free from springy, bushy, tangled or matted materials, lumps, iron borings, non-ferrous metals in a free State, scale, excessive oil and badly rusted or corroded stocks. Heavy steel turnings shall be free of light turnings like machine shop turnings and shall include rail chips, railroad axle and heavy forgings with minimum bulk density of 1 200 kg/cubic meter in the original state of production.

10.7.2 *Light Steel Turnings*

It shall consist of clean steel light turnings, drilling or screw cuttings. May include materials resulting from crushing, raking or other process. It shall be free from springy, bushy, tangled or matted materials, lumps, iron borings, non-ferrous metals in a free State, scale, excessive oil and badly rusted or corroded stocks. The density should be mutually agreed between the customer and the supplier.

10.7.3 *Mixed Steel Turnings*

It shall consist of clean steel turnings mixed with from cast or malleable iron, stainless steel and alloyed steel turnings but free from non-ferrous metals in a free state, scale or excessive oil and badly rusted or corroded stocks. The density should be mutually agreed between the customer and the supplier.

10.7.4 *Steel Turning with Boring*

It shall consist of clean steel both heavy and light turnings with borings. It shall be free from non-ferrous metals in a free State, scale, excessive oil and badly rusted or corroded stocks. The density should be mutually agreed between the customer and the supplier.

10.7.5 *Mixed Steel Turning with Boring*

It shall consist of clean steel turnings, including stainless steel, alloy steel, cast iron turnings and borings, mixed in any proportion free from non-ferrous metals in a free state and scale, and shall be free from badly rusted or corroded stocks. The density should be mutually agreed between the customer and the supplier.

10.7.6 *Old Turning*

It shall consist of obsolete heavy and light ferrous turnings including stainless steel, cast iron and alloy steel mixed with cast iron turnings including springy, bushy, tangled or matted materials, free from cast iron borings, badly rusted or corroded stock reasonably free from excessive oils, scales and dirt, but shall exclude grindings, scale and non-metals in a free state. It may also include heavy turnings from axles and forgings or rail chips. The density should be mutually agreed between the customer and the supplier.

10.7.7 *Mixed Old Turning with Boring*

It shall consist of old steel, stainless steel and alloy steel mixed with cast iron turnings including springy, bushy, tangled or matted materials, lumps iron borings, cast iron borings and turnings, badly rusted or corroded stock but shall exclude grindings, scale and non-metals in a free state. The density should be mutually agreed between the customer and the supplier.

10.7.8 *Briquetted Iron Borings*

It shall consist of cast iron borings and turnings, briquetted to a solid mass, free from non-ferrous metals and scale, and shall be free from badly rusted or corroded stocks.

10.7.9 *Briquetted Steel Turnings*

It shall consist of steel turnings and borings briquetted to a solid mass, free from nonferrous metals and scale and shall be free from badly rusted and corroded stocks. Bulk density can be mutually agreed to between the interested parties.

10.7.10 *Special Boring Grades*

10.7.10.1 *No. 1 Chemical boring*

New clean cast or malleable iron borings and drillings containing not more than 1 percent oil, free from steel turnings, or chips, lumps, scale, corroded or rusty materials.

10.7.10.2 *Briquetted cast iron borings, hot process*

Cast iron borings, heated, briquetted, to a density of approximately 85 percent, oil and water content under 1 percent.

10.7.10.3 *Briquetted cast iron borings, cold process*

Cast iron boring briquettes, free of steel and non-ferrous material, hydraulically compressed into a cohesive solid, reasonably free of oil, and having a density of not less than 60 percent.

10.7.10.4 *Malleable boring*

Clean malleable iron borings and drillings, free of steel turnings, scale, lumps and excessive oil.

10.7.10.5 *No.2 Chemical boring*

New clean cast or malleable iron borings and drillings containing not more than 1.5 percent oil, free from steel turnings, or chips, lumps, scale, corroded or rusty materials.

NOTE — Prior information on the briquetting process shall be shared to the customer and shall follow the one which is mutually agreed between the customer and the supplier.

10.8 Cast Iron Scrap

Different grades of scraps should not be mixed with each other in bundle form. The bundle should maintain the purity (free of non-ferrous, organic and inorganic material) of each grade by 98 percent minimum. However, based on the mutual agreement, mixed bundles can be used in EAF and IF.

10.8.1 *Machinery Grade Cast Iron*

It shall consist of clean and close-grained cast iron of low phosphorous grade used exclusively for the manufacture of soft machinable casting. It shall be of cupola size and shall not exceed the dimension and weight shown in Table 2. The classifications are machinery grade cast iron No. 1 and No. 2.

Table 2 Classes of machinery grade cast iron
(*Clause* 10.8.1)

Sl No. (1)	Class (2)	Maximum Size (3)	Maximum Weight (4)
i)	No. 1	400 mm x 400 mm	40 kg
ii)	No. 2	600 mm x 750 mm	75 kg

NOTE — Weight and dimension other than those indicated in the above table can be supplied based on the mutual agreement between the contracting parties. However, minimum weight shall be less than 75 kg and sizes shall be less than 600 mm x 750 mm.

10.8.2 *Cast Iron Grades*

It shall consist of clean cast iron scrap, such as pipes (excluding soil pipes), railway sleepers, chairs or plates. It shall avoid mixing of melting pots, stove plates, grates, burnt iron, railway brake blocks or foreign material with other classes. Class No. 1 material shall be used for cupola charging, for charging in cupola furnaces for induction melting, the dimension shall not exceed 600 mm x 750 mm and piece shall weigh as indicated in the Table 3.

Table 3 Classes of Cast Iron Grades
(*Clause* 10.8.2)

Sl No. (1)	Class (2)	Source (3)	Maximum Weight (4)
i)	No. 1	Pipes (free from soiled pipes), sleepers, chairs, column, agricultural tool, machinery parts	75 kg
ii)	No. 2	Railway brake blocks, soil pipe, counterweights of lifts or cast-iron, automotive engines, heavy cast iron pieces, hammers, heads, gates, risers, machinery parts	250 kg
iii)	No. 3	Melting pots, stoves, grates, burnt iron, railway brake blocks, radiators, cylinders, driving wheel centers miscellaneous items (Burnt Scrap)	250 kg

10.8.3 *Charging Box Cast*

Clean cast iron scrap in sizes not over than 1 500 mm in length and 750 mm in width, suitable for charging in a furnace without preparation. Free from burnt iron, brake shoes or stove plates.

10.8.4 *Mixed Cast Iron*

May include all grades of cast iron except burnt iron. Dimensions not over 600 mm x 750 mm and no pieces over 75 kg in weight.

10.8.5 *Cast Steel Scraps*

Steel castings not over than 1 200 mm long and 450 mm wide and thickness not less than 3 mm, free from alloys and attachments. May include head, gates, risers, truck sides, frames, bolsters etc. Other standard sizes include 1 500 mm length maximum and 450 mm wide maximum with thickness over than 3 mm.

10.9 Ingot Mould and Bottom Plate Scrap

It shall consist of used, rejected unbroken ingot mould and bottom plates of mould. However, there are classes based on the weight restriction and shall be followed as indicated in Table 4. Size restriction for broken ingot mould is 600 mm x 900 mm x 1 500 mm.

Table 4 Classes of Ingot Mold and Bottom Plate Scrap
(*Clause* 10.9)

Sl No. (1)	**Class** (2)	**Maximum Weight** (3)
i)	Unbroken	No weight restriction
ii)	Semi-broken No 1	≤ 10 000 kg
iii)	Semi-broken No 2	≤ 3 000 kg
iv)	Broken No 1	≤ 500 kg
v)	Broken No 2	≤ 50 kg

10.10 Skull Scrap

It shall consist of ferrous cast iron and cast steel skull scrap produced out of steel melting units, cupola, electric arc furnace and induction furnace, shall be reasonably free from slag and impurities and in pieces shall weigh maximum as indicated in the table below. The scrap is classified into processed, semi-processed and unprocessed category based on the nature of purity of the ferrous material in the scrap. The maximum allowable slag percent in the scrap shall comply as indicated in Table 5. The skull scrap is divided in cast steel skull scrap and cast-iron skull scrap

10.10.1 *Cast Steel Skull Scrap*

It shall consist of cast steel skull scrap produced in the process of steel making including foundries. The scrap also includes ladle bottom where the first two forms are described in Table 5.

Table 5 Classes of Cast Steel Skull Scrap
(*Clause* 10.10.1)

Sl No. (1)	**Class** (2)	**Maximum Weight** (3)	**Maximum % Slag** (4)
i)	Processed	≤ 500 kg	≤ 3 %
ii)	Semi processed	≤ 2 500 kg	≤ 5 %

The third form of skull scrap may include unprocessed scrap where maximum weight and % slag can vary based on mutual agreement between the contracting parties.

10.10.2 *Cast Iron Skull Scrap*

It shall consist of cast iron skull scrap produced in foundries and steel plants. The scrap also includes ladle bottom where the first two forms are described in Table 6.

Table 6 Classes of Cast Steel Skull Scrap
(*Clause* 10.10.2)

Sl No. (1)	**Class** (2)	**Maximum Weight** (3)	**Maximum % Slag** (4)
i)	Processed	≤ 500 kg	≤ 3 %
ii)	Semi processed	≤ 2 500 kg	≤ 5 %

The third form of cast steel skull scrap may include unprocessed scrap where maximum weight and % slag can vary based on mutual agreement between the contracting parties.

10.11 Foundry Scrap

Ferrous scrap generated from foundry can also be classified under but not limited to the following

10.11.1 *Foundry Steel*

Steel scrap of thickness greater than or equal to 3 mm, not over 600 mm in length x 450 mm in width. Individual pieces free from attachment. May not include nonferrous metals, cast or malleable iron, cable, vitreous enameled or metal coated materials. The other standard size includes 300 mm in length and 450 mm in width.

10.11.2 *Foundry Steel Bushellings*

Black carbon steel scrap of thickness greater than or equal to 3 mm thickness not more than 600 mm x 300 mm size with manganese content not more than 0.5 percent. Other parameters based on mutual agreement between the customer and the supplier.

10.11.3 *Foundry Shredded Clips*

Shredded black 1 000 series carbon steel scrap, 3 mm and over in thickness, minimum average bulk density of 1 200 kg/cubic meter with manganese content not more than 0.5 percent . Other parameters based on mutual agreement between the customer and the supplier.

10.12 Specific Stainless and Alloy Steel Grades

10.12.1 *200 Series Stainless Steel Scrap*

It shall consist of all types of clean stainless-steel scrap, which containing minimum 13.5 percent chromium and a minimum of 0.4 percent copper, free of foreign attachments and other contaminations. Apart from chromium and copper, other elements may also be present as per the chemistry of the grade.

10.12.2 *300 Series Stainless Steel Scrap*

It shall consist of clean stainless steel scrap only in solids and turning, containing a minimum of 6 percent nickel, 15 percent chromium and free of harmful contaminants shall be supplied in loose or bundle form. Apart from nickel and chromium, other elements may also be present depending on the chemistry of the grade. Particulars concerning physical description, grading, additional analysis and preparation to be agreed upon between buyer and seller.

10.12.3 *400 Series Stainless Steel Scrap*

It shall consist of all types of clean stainless-steel scrap solids and turnings, containing minimum 10.5 percent chromium and shall be free of foreign attachments and contaminants. Apart from chromium, other elements may also be present depending on the chemistry of the grade. Particulars concerning physical description, grading, additional analysis and preparation to be agreed upon between buyer and seller.

10.12.4 *Duplex and other Grades of Stainless Steel Scrap*

It shall consist of all types of clean stainless-steel scrap solids and turnings, and shall be free of foreign attachments and contaminants. Various elements may be present in the grade depending on the chemistry of the grade. Particulars concerning physical description, grading, additional analysis and preparation to be agreed upon between buyer and seller.

10.12.5 *High Speed Steel Scrap (6-5-2)*

It shall consist only of 6-5-2 type high speed steel scrap solid and turnings either in loose, shredded or bundle form, containing not less than 5.5 percent tungsten, 4.5 percent molybdenum, 1.7 percent vanadium. It shall be free from any other alloys, foreign attachments, oil and other contaminants. Particulars concerning physical description, grading, additional analysis and preparation to be agreed upon between buyer and seller.

10.12.6 *High Speed Steel Scrap (18-4-1)*

It shall consist of 18-4-1 type high speed steel scrap solid and turnings, containing not less than 17 percent tungsten, 3 percent chromium and 1.5 percent vanadium. It shall be free from any other alloys, foreign attachments, oil and other contaminants. Particulars concerning physical description, grading, additional analysis and preparation to be agreed upon between buyer and seller.

10.12.7 *Other Alloy Steel Scrap*

It shall consist of alloy steel scraps of varying alloying elements mutually agreed between the customer and the supplier. It shall be free from any other alloy and foreign attachments, oil and other contaminants. Particulars concerning physical description, grading, additional analysis and preparation to be agreed upon between buyer and seller.

10.13 Auto Dismantle Scrap (ELV)

Scrap generated from dismantling of obsolete automotive ferrous scrap can be classified under the following scrap. This is also called as end of life of vehicle (ELV) scrap.

10.13.1 *Auto Casts*

Clean automotive ferrous scraps like springs, crankshafts, camshafts, valves, studs, autoblocks, bearings, axles, brakes, brake shoes, gears, chains, links etc. Free of nonferrous materials and nonmetallic parts and must not be over 900 mm x 450 mm. Other standard size being 600 mm x 450 mm.

10.13.2 *Auto Structurals*

Clean automotive ferrous scrap like bumpers, fenders, rails, recliners, reinforcements, pillars, hinges, panels, internals etc. Free of nonferrous materials and nonmetallic parts and must not be over 750 mm x 750 mm.

10.13.3 *Auto Slabs*

Clean auto slabs of dimensions must not be over 900 mm x 450 mm maximum to be used directly for charging in the furnace. Can be charged individually or in bundles. Other standard size being 600 mm x 450 mm.

10.14 Railroad Scrap

Ferrous scrap generated specifically from obsolete rails and railway tracks/scrapped cars which can be broadly categorized as follows. May fit in other sections classified earlier, but this section is for customers and supplier to categorize only graded railway scraps.

10.14.1 *Rail Wheels and Tires*

All locomotive tires and wheels, solid cast steel, forged, pressed and/or rolled steel car and/or locomotive wheels etc. All pieces should be loose form and should not be attached to each other.

10.14.2 *Rails*

Clean steel of any thickness however the sizes is restricted to 900 mm maximum and weighing not more than 25 kg.

10.14.3 *Axles*

Solid car or locomotive friction bearings, roller bearing etc of diameter as given in Table 7.

Table 7 Categories of Railroad Axles
(*Clause* 10.14.3)

Sl No. (1)	**Categories** (2)	**Diameter** (3)
i)	Class A	≤ 200 mm
ii)	Class B	> 200 mm

10.14.4 *Obsolete Track and Car Material (OTCM)*

This include all obsolete track materials of any diameter and thickness. The length of the individual pieces should not be greater than 1 500 mm in length. This includes fish plates, spikes, track bolts, nuts screws, lock washers, anchors, tie plates, angles, splice bars, bolsters, guard rails, frogs, switch points, tee, girders, couplers, knuckles, brake shoes etc.

10.14.5 *Springs*

This includes all types of railway springs, valve springs, leaf springs, coils, elliptical springs etc. of diameter not less than 3 mm.

10.14.6 *Locomotive Bodies*

This includes bodies of steel wagons cut with maximum size of 1 500 mm x 900 mm.

10.14.7 *Railway Coated Scrap*

Galvanized, tinned or any metal coated and/or gas retorts, and/or any other iron or steel material not otherwise classified.

10.15 Tool Steel

This include all kind of obsolete tool steel scrap. May be offered based on the mutual agreement with the customer and the supplier. This includes dies, anvils, hammers, blocks etc.

10.16 Tyre Bead Wires

Tyre bead wire is used in all kinds of automobile tyres, tyre of earth moving equipment and aircrafts. Can be supplied in loose, shredded or bundle form. This include pulled bead wires (truck and passengers), processed tire wires etc. Percentage of rubber and fiber along with the scrap to be mutual agreed between the suppler and the consumer. Standard grading of percentage fibers/rubbers is described in Table 8.

Table 8 Rubber and Plastic Content in Pulled Bead Wire and Processed Wire
(*Clause* 10.16)

Sl No. (1)	**Categories** (2)	**Truck/ Passenger Pulled Bead Wire** (3)	**Processed Ferrous Wire** (4)
i)	Grade 1	< 5 %	< 2 %
ii)	Grade 2	5 % to 10 %	2 % to 5 %
iii)	Grade 3	> 10 %	5 % to 10 %
iv)	Grade 4	--	> 10 %
v)	Grade 5	--	> 20 %

11 REROLLABLE FERROUS SCRAP

11.1 Defectives and Rejects

It shall consist of cuttings, rejected and discarded ingots, slabs, blooms, billets, bars, rods, angles, shapes and section rails and railway material such as wheels, tyres, axles, sleepers, sleeper bars, fish plates and flat rolled product suitable for re-rolling without undergoing process of melting and of length up to 5 000 mm and up to 2 000 mm width with thickness or diameter 5 mm minimum. In case of rails and railway materials the maximum length is restricted to 10 000 mm.

11.2 Obsolete and Salvaged

It shall consist of obsolete, old and salvaged plate, sheets, strips, bars, angles, channels, beams, rail and railway materials such as wheels, tyres, axles, sleepers, sleeper bars, fish plates and flat rolled product including their cuttings and shearing. It also includes materials obtained from breaking of old ships suitable for rerolling without undergoing the process of melting. It also includes plates, beams and structural generated as a resulted of dismantling of old buildings, airports, bridges, industries, warehouses, stations etc. It also includes material generated from other sources like dismantling railway wagons, truck bodies, defense equipment, yellow goods etc. The maximum length shall be up to 5 000 mm and up to 2 000 mm width with thickness or diameter 5 mm minimum. In case of rails and railway material the maximum length is restricted to 10 000 mm.

11.3 Crop Ends

It shall consist of crop ends (front and back end cuttings) of semi-finished or finished products like slabs, blooms, billets, rods, bars, plates, strips, sheets, angles, channels, rails etc. suitable for re-rolling of maximum and minimum sizes agreed between the consumer and the suppler.

12 REMANUFACTURING SCRAP

12.1 New Scrap

It shall consist of end cuts or rejected material from finished products like plates, strips, sheets, bars, angles, channels, beams, rails, rods, rebars, axles, wheels, bearings, gears etc. which can be used directly for the process of refurbishing products directly without undergoing the process of re-melting or rerolling. It shall consist of prompt and home scrap only.

12.2 Obsolete Scrap

It shall consist of cuttings or shearing’s generated from salvaged obsolete products like plates, strips, sheets, bars, angles, channels, beams, rails, rods, rebars, axles, wheels, bearings, gears etc. which can be used directly for the process of refurbishing products directly without undergoing the process of re-melting or rerolling. It shall consist of obsolete scrap only.

Use of remanufacturing scraps is limited to mutual agreement between the manufacturer and the supplier. The internal soundness, chemical composition, microstructure and mechanical properties should be evaluated and shall be in conformance with the end standard in which the finished component finally complies.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Wrought Steel Products Sectional Committee, MTD 04

Organization	*Representative(s)*
SAIL, RDCIS, Ranchi	SHRI NIRVIK BANERJEE **(*Chairperson*)**
All India induction furnace association, New Delhi	SHRI A. K. SHARMA SHRI PRABHAKAR MISHRA (*Alternate*)
AM/NS Steel (Hazira, Surat)	SHRI DEEPAK GUPTA SHRI KALPESH DAVE (*Alternate*)
Bharat Heavy Electrical ltd, Bhopal	SHRI S. K MAHAJAN SHRI ARUN KHARE (*Alternate*)
Central Boilers Board, New Delhi	SHRI T. S. G NARAYANNEN SHRI S. K JAIN (*Alternate*)
Cold Rolled Steel Manufacturers Association of India, New Delhi	SHRI RAJIV CHATURVEDI SHRI N. K. SOOD (*Alternate*)
DMRL, Ministry of Defence, Hyderabad	SHRI R. V. S. NAGESH
Institute of Steel Development and Growth, Kolkata	SHRI P. L. RAO SHRI SAJAL KUMAR GHORAI (*Alternate*)
Indian Machine tools Manufacturers association	SHRI Y. BALARAMAIAH
JSW steel Ltd, Dolvi/Salem	SHRI SUBHASIS CHAKRABORTY SHRI B. M. HASAN (*Alternate*)
JSW Ltd, Bellary	SHRI DEVASISH MISHRA SHRI G. V. RAMANA (*Alternate*)
Jindal Steel & power ltd (JSPL)	SHRI MORESHWAR BORKAR SHRI JOY DUTTA (*Alternate*)
Ministry of Defence (DGOFB), Kolkata	SHRI R. D. BARMA
Ministry of Defence (DGQA), Ichapur, WB-743144	SHRI K YADAV SHRI G. SUBBA RAO (*Alternate*)
Ministry of Shipping, New Delhi	SHRI ANIL PRUTHI SHRI RAMJI SINGH (*Alternate*)
Ministry of Steel (Govt. of India), New Delhi	SHRI PARAMJEET SINGH SHRI BHAGIRATHI PRADHAN (*Alternate*)
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Research Designs and Standards Organization (RDSO), Lucknow	SHRI MANOJ KUMAR GUPTA SHRI SALISH ORAON (*Alternate*)
SAIL, Bhilai Steel Plant, Bhilai	SHRI SHRIRANG KHANKHOJE SHRI K.V. SHANKAR (*Alternate*)
SAIL, Bokaro Steel Plant, Jharkhand	SHRIMATI BISWASI SUNITA MINZ SHRIMATI ROSELIN DODRAE (*Alternate*)

Organization	*Representative(s)*
SAIL, Research & Development center for Iron & Steel, Ranchi	SHRI P. PATHAK SHRI S. SRIKANTH (*Alternate*)
SAIL, Rourkela Steel Plant, Rourkela	SHRI KUNTAL PATWARI SHRI RAMAKRISHNAN P. (*Alternate*)
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Steel Authority Of India Limited, IISCO Steel Plant, Barddhaman	SHRI A. DAS GUPTA SHRI SAIKAT DE (*Alternate*) SHRIMATI PREETI DEWANGAN (*Young Professional*)
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Tata Motors Ltd (Pune)	SHRI PRADEEP KULKARNI SHRI LOKESH PALIWAL (*Alternate*)
Tata Steel Ltd, Jamshedpur	SHRI AVTAR SINGH SAINI SHRI SUDIPTO SARKAR (*Alternate*)
The Tin Plate Company of India Ltd, Jameshedpur	SHRI S. J. DEY SHRI SUBRATA SADHU (*Alternate*)
In Personal Capacity, *(New Delhi)*	SHRI A. C. R. DAS
BIS Directorate General	SHRI SANJIV MAINI, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (METALLURGICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Panel for revision of standard on classification of ferrous scrap MTD 04/P 25

Organization	*Representative(s)*
Ministry of Steel, New Delhi	SHRI PARMJEET SINGH **(*Convenor*)**
Directorate General of Foreign Trade (DGFT), New Delhi	SHRI SANJAY TIWARI
Iron Steel Scrap and Ship breakers Association of India, Mumbai	SHRI NAGAR SETH
IZA India (International Zinc Association), New Delhi	SHRI KENNETH DE SOUZA SHRI RAHUL SHARMA (*Alternate*)
Material Recycling Association of India (MRAI), Mumbai	SHRI SATISH KOHLI SHRI ZAIN NATHANI (*Alternate*) SHRI RITESH MAHESHWARI (*Alternate*)
MSTC Limited, Kolkata	SHRI TANMOY SARKAR SHRI CHIRAG SINDHU (*Alternate*)
Tata Steel Limited, Jamshedpur	SHRI SUDIPTO SARKAR SHRI ANEESH SINGHAL (*Alternate*) SHRI BASDA BANERJEE (*Alternate*)

Member Secretary
SHRI ARUN PUCCHAKAYALA
SCIENTIST 'D'/JOINT DIRECTOR,
(METALLURGICAL ENGINEERING), BIS

(*Continued from second cover*)

Ferrous scrap is the prime raw material for secondary sector and used in primary steelmaking to the tune of around 15%, to improve efficiency and minimize production cost. The availability of right raw material and graded scrap at competitive rate is imperative for the growth of steel industry. Steel Scrap is most conducive for circular economy as it can be reused and recycled infinitely. Availability of graded scrap in India is a concern and being a scrap deficit country, the standard will help in abridging the gap of our knowledge in graded scrap and will align the processing, segregation and categorization of all scrap processors in the country towards similar direction. This will promote a healthy and competitive ecosystem in the country which will further stress on maximizing scrap collection and availability of graded scrap.

The composition of the committee responsible for the formulation of this standard is listed at Annex A.

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